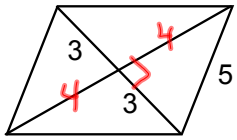
1. The area of a triangle is 48 units^2. The height is 8 units. What is the base? 12u

$A = \frac{1}{2}bh$
$48 = \frac{1}{2} \cdot 8b$

2. 2nd diagonal 8
Area $\frac{1}{2} \cdot 8 \cdot 6 = 24u^2$

Rhombus

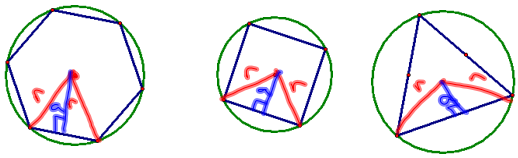


$5^2 = 3^2 + x^2$
$16 = x^2$
$4 = x$

11-3 Areas of Regular Polygons and Circles

Any regular polygon can be inscribed in a circle.

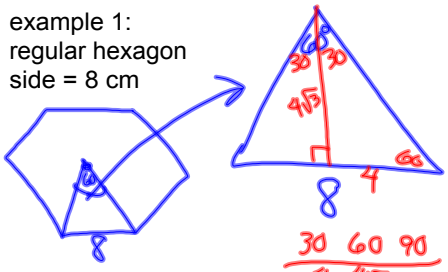
Radius--from center to vertex
Apothem--from the center and perpendicular to one side



$A = \frac{1}{2} a \cdot p$
perimeter

Area = ½ a p

example 1:
regular hexagon
side = 8 cm



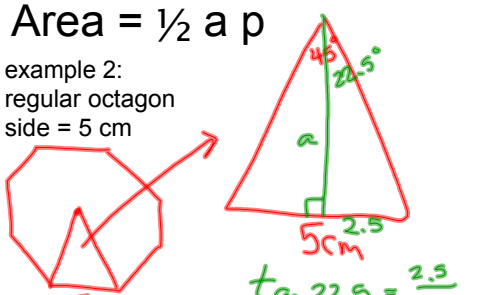
30 60 90
4 $4\sqrt{3}$

$360 \div 6 = 60°$

$A = \frac{1}{2} 4\sqrt{3} \cdot 48$
$96\sqrt{3}$ cm^2

Area = ½ a p

example 2:
regular octagon
side = 5 cm



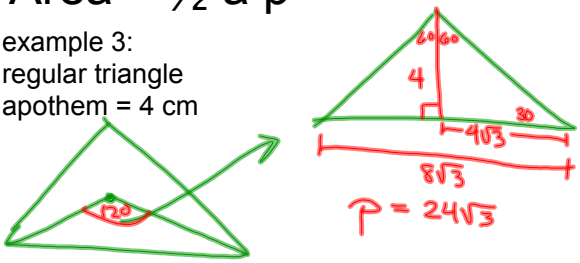
$360 \div 8 = 45$

$\tan 22.5 = \frac{2.5}{a}$
$a \tan 22.5 = 2.5$
$a = \frac{2.5}{\tan 22.5}$
$a \approx 6.04$

$A = \frac{1}{2}(6.04)\,40$
≈ 120.7 cm^2

Area = ½ a p

example 3:
regular triangle
apothem = 4 cm



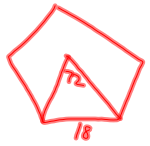
$P = 24\sqrt{3}$

$A = \frac{1}{2} 4 \cdot 24\sqrt{3}$
$= 48\sqrt{3}$ cm^2

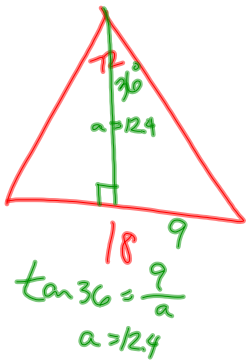
Area = ½ a p

example 4:
regular pentagon
perimeter = 90 cm

one side = 18



90 ÷ 5
360 ÷ 5

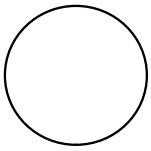


$\tan 36 = \frac{9}{a}$

$a = 12.4$

$A = 557.4\ cm^2$

Area of a circle= πr^2



r = 4 cm

$A = 16\pi\ cm^2$

$C = 24\pi$

$r = 12$

$A = 144\pi\ u^2$

Find the area of the shaded region.
The radius is 8 cm.

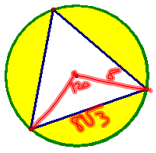
$A_{circle} - A_{sq}$

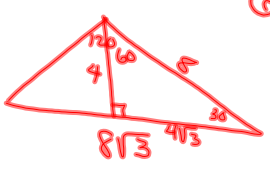
$64\pi - (8\sqrt{2})^2$

$64\pi - 128$

$73.1\ cm^2$

Find the area of the shaded region.
One side of the triangle is $8\sqrt{3}$ cm.





$A_{circle} - A_{\triangle}$

$64\pi - \frac{1}{2} 4 \cdot 24\sqrt{3}$

$64\pi - 48\sqrt{3}$

$117.9\ cm^2$

HW
p613-614

8-14, 16, 30

Find the area of each polygon. Round to the nearest tenth.

8. a regular octagon with a perimeter of 72 inches
9. a square with a perimeter of $84\sqrt{2}$ meters
10. a square with apothem length of 12 centimeters
11. a regular hexagon with apothem length of 24 inches
12. a regular triangle with side length of 15.5 inches
13. a regular octagon with side length of 10 kilometers

Find the area of each shaded region. Assume that all polygons that appear to be regular are regular. Round to the nearest tenth.

14.

16.

Find the area of each circle. Round to the nearest tenth.

30. $C = 34\pi$